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ABSTRACT

This study was designed to compare the inter-/intra-correlational and the behavioral commonalities approaches to the assessment of attachment behaviors of infants to their mothers. At 7 months, 147 infants were observed (and videotaped) sequentially during a free play period with their mothers present, a separation from their mothers and then a reunion period. At 13 months, 47 of the infants were observed under conditions which elicited attachment behaviors by increasing stress through alternating separation, stranger present and mother present conditions. Observers judged infants as either unattached, securely attached, or insecurely attached. It was hypothesized that the more traditional inter-/intra-correlation of discrete attachment behaviors would be less predictive of these behaviors within and across time than an attachment assessment focused on commonalities in behavioral responses to separation and reunion episodes. Results indicate that intra- and inter-behavioral correlations among discrete attachment behaviors were consistently low both in the number which reached statistical significance and the magnitude of the significant correlations. Multiple regression analysis was successful in predicting 13-month classifications from 7-month reunion and separation behaviors. Touch at 7 months was the strongest predictor of 13-month attachment classification. Increased emphasis on commonalities of responses within situational contexts is recommended. (Author/RH)

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# Separation and Reunion Behaviors as Indices of Attachment: A short-term longitudinal study of infants from seven to thirteen months

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## Abstract

This study compared the correlational method of assessing and predicting attachment behaviors with a behavioral commonalities approach that emphasized attachment patterns of behaviors. One hundred forty-seven mother-infant pairs were observed in separation and reunion situations when the infants were seven months old. Forty-seven of the infants were again observed in the Ainsworth Strange Situation at 13 months. The results clearly indicate the superiority of the commonalities approach over the correlational approach. Whereas all intra- and inter-behavioral correlations were low, the commonalities approach permitted accurate prediction of attachment classification at 13 months from five minutes of observation at seven months. The methodological and theoretical implications of the findings are discussed.

Separation and Reunion Behaviors as Indices of Attachment:
A short-term longitudinal study of infants from seven to thirteen months

Recent infant research has suggested the importance of separation and reunion behaviors as indices of the global contruct of attachment (Ainsworth, et al., 1971; Waters, Note 1). This focus may aid to clarify the concept of attachment through a somewhat different, perhaps more specific, operational definition of attachment. Such a need has become increasingly evident as a result of a number of reports (e.g. Coates, et al., 1972 a, b) indicating a distressing lack of stability in attachment behaviors. Numerous significant, but consistently low to moderate intercorrelations which account for only a small proportion of the variance also suggest that more specificity may be required to define and measure attachment. Masters and Wellman (1974) have carefully reviewed several attachment studies and suggested that the concept, as measured by inter- and intra- correlations of attachment behaviors, has not been appropriately assessed. They suggest, as have others (Ainsworth, et al., 1971; Cohen, 1974; Waters, Note 1), that commonalities of behaviors in response to particular situational events constitute a more appropriate and thus a more accurate measure of the infants's attachment to his or her mother.

Several recent findings lend support to this view. Tracy, et al., (1976) and Lamb (1977) have both reported that the infant seems to employ two separate behavior systems, one affilitative and the other attachment, depending upon the situation and the affective state of the infant. In

a normal, non-stressful, free play situation the infant is unlikely to engage in a great deal of interactive, attachment behavior with mother. In fact, given a choice, the infant may be more likely to approach an habituated stranger (Tracy, et al., 1976). However, if the situation should become stressful or is initially stressful, the infant is much more likely to engage in attachment behaviors with mother and to ignore, if not actively avoid, the stranger.

In light of these recent findings, the present study was designed to compare the inter-/intra- correlational and behavioral commonalities approaches to the assessment of attachment. This comparison was made in the assessment of attachment at seven and 13 months and in the predictability of attachment at 13 months from seven month infant behaviors. It was hypothesized that the more traditional inter-/intra- correlation of discrete attachment behaviors would be less predictive of these behaviors within and across time than an attachment assessment focusing on commonalities in behavioral responses to separation and reunion episodes. These particular situations were chosen on the basis of previous work (Ainsworth, et al., 1971) which suggested that both separation and reunion situations are likely to activate the attachment system.

## Method

Subjects. The initial sample consisted of 166 infants from white, middle class families living in Syracuse and the surrounding area. The infants ranged in age from 6.5 to 7.5 months. Names of potential subjects were obtained through birth announcements published in the local newspapers.

Mothers were contacted by letter and subsequently by telephone. Of those contacted, approximately 75 percent agreed to participate in the study. Complete data were obtained for 147 infants. Of these, 77 were female; 70 were male. Only one infant failed to complete the observation sequence. Data for 15 infants were lost through equipment malfunction. One videotape containing recordings of three infants was inadvertantly erased.

Forty-seven infants were observed again at 13 months. Eighty mothers had been requested to return with their infants but various external constraints (a blizzard, the flu, etc.) prevented many of them from doing so. Only a few mothers said they did not want to return.

Observational setting. Both the initial seven month study and the 13 month study follow-ups were conducted in the Infant Research Laboratory at Syracuse University. Infants and their mothers were observed in a 3.66m x 5.03m playroom. A small observation room containing videotape equipment was located adjacent to the playroom. All observations were recorded on videotape through a one way glass.

Procedure. At seven months, the procedure consisted of a free play period followed by a brief separation and reunion sequence. Infants returning at 13 months were observed within the context of the Ainsworth Strange Situation (Ainsworth and Wittig, 1969). Details of both procedures are reported below.

Observation 1: infants at seven months. Upon arrival at the laboratory, each mother was escorted with her infant to the playroom, which contained a

sofa, a table, some current magazines, and several toys. She was instructed to make herself comfortable during a brief warm-up period, and to leave the room at the sound of a knock. Instructions to mothers were minimized in an attempt to provide as naturalistic a situation as is possible in the laboratory.

Following the 15 minute preseparation period, mothers were signaled to leave the playroom, closing the door behind them. They were brought into the observation room where they could view their infants during the separation period. At the end of the two minute separation episode, mothers were asked to return to the playroom for a period of three minutes. Separation, and reunion episodes were videotaped.

Response measures for Observation 1. Although both mother and infant behaviors were recorded since infant behaviors are the focus of the present study, only details of the coding of infant behaviors are presented. Infant separation variables included vocalizing, looking for mother, smiling, following, playing, exploring, neutral behaviors, crying and fussing. Infant variables for the reunion episodes included vocalizing, looking at mother, smiling, proximity seeking, touching mother, playing with mother, playing alone, exploring, neutral behaviors, crying and fussing. In addition, it was noted whether the mother and baby were engaged in an interactive sequence during the interval or were rather involved in independent activity. Behaviors were coded from the videotaped recordings by trained observers. At 10 second intervals, the tape was stopped and

and the occurrence of any of the infant behaviors during the interval was noted on a coding form.

Reliability was established by having the three observers code simultaneously 10 tapes chosen at random and calculating for each variable an agreement/agreement + disagreement ratio for each observer in comparison to a fourth coder who had been previously established as reliable. Reliability scores thus obtained ranged from .86 for looking at mother to 1.00 for baby crying. The mean reliability score for the three observers was .958.

Observation 2: infants at thirteen months. The infants who returned for the follow-up study were observed within the context of the Ainsworth Strange Situation which has been described in detail elsewhere (Ainsworth and Wittig, 1969). Briefly, the procedure involves a series of eight increasingly stressful episodes designed to elicit attachment behaviors in infants. The procedures followed in these episodes are summarized below.

Episode 1. Mother and baby are shown into the playroom. Observer leaves.

Episode 2. Mother and baby are alone for three minutes.

Episode 3. A stranger enters, sits silently for one minute, converses with the mother for one minute, and then attempts to play with the baby for one minute.

Episode 4. Mother leaves, and baby is alone with the stranger for three minutes.

Episode 5. Mother returns, the stranger exits, and mother and baby are together for three minutes.

Episode 6. Mother leaves baby alone for three minutes (or less if the infant becomes quite distressed).

Episode 7. The stranger enters and spends three minutes with baby.

Episode 8. Mother returns, the stranger leaves, and the reunion is observed. Duration unspecified.

Infants were observed in the same playroom as in Observation 1; however, this time the room contained two chairs (one for mother and one for the stranger), a table, and several toys. As Strange Situation assessment is focused exclusively on infant behaviors, mothers were instructed to respond naturally to their infant's overtures, but not to initiate any interaction. Strangers' approaches and mothers' departures were signaled by knocks from the observation room. Three female student assistants served as strangers throughout the study. Determination of who would act as a stranger for any given infant was made largely on the basis of availability but overall, each stranger served an approximately equivalent number of times.

Response measures for Observation 2. The Strange Situation yields three sets of response measures: a frequency count of several discrete attachment and exploratory behaviors; observer ratings on six scales designed to yield an assessment of the quality of the infant's attachment to the caretaker; and a classification of infants as belonging to one or another attachment category.

The first of these provides for each episode a tally of the following behaviors: locomotion, manipulation, visual exploration, and total exploration, looking (at mother and stranger), real cry, minimal cry, total cry, vocalization, smiling and neutral.

The second set of measures consists of the following seven point scales: proximity seeking, proximity avoidance, contact maintenance, contact resistance, search during separation, and distance interaction. Observers rate the infants behavior for each of these scales at the end of each episode in reference to the mother and to the stranger where applicable.

The final measure, the attachment classification, is accomplished through a qualitative judgment on the part of the observer, taking into account the profile of behaviors exhibited by the infant throughout the entire sequence of events. Infants can be classifed as one of three major types (A, B, or C) and 11 subtypes. Although all infants were classifed according to both type and subtype, the small number of infants in each category precluded the inclusion of subtype as a factor in the analyses. Of the major types, the predominating feature distinguishing Type A "unattached" babies is mother avoidance; the primary criteria for classifying

infants as Type B "securely attached" are proximity seeking at points of stress, and using the mother as a secure base from which to explore the surroundings; and Type C "insecurely attached" infants are characterized by a profile reflecting vacillation and indecision with respect to mother-directed and exploratory behavior.

Reliability for three observers was established by calculating a ratio in the form of number agrees/number of agrees + number of disagrees on all measures for each observer. Reliability on all measures was high, averaging .95. Reliability for attachment calssification was 1.00.

## Results

The inter-correlations of separation and reunion behaviors and the intra-behavioral correlations of separation and reunion behaviors at seven months are presented for the larger sample of 147 infants. The inter- and intra-behavioral correlations of the Ainsworth Strange Situation at 13 months are presented for the smaller sample of 47 infants. The seven and 13 month inter-/intra-correlational comparisons are also based on the smaller sample. In order to avoid inflation of the correlations by nonoccurrences, if a behavior did not occur it was eliminated from the analyses and the correlation was calculated on the reduced N. It seemed imappropriate to inflate the correlations of attachment behaviors, which are designed to assess attachment and predicted to occur as an indication of attachment, with nonoccurrences of these behaviors. This procedure

provides a fairly conservative test of the relationships among attachment behaviors. In addition if a calculation was based on a sample of ten or less, the correlation is not reported since the results would be spurious and might provide a misleading impression of the data.

Inter-Correlations of Separation Behaviors at Seven Months

The correlations presented in Table 1 are based on the two minute separation episode each infant experienced at seven months. Of the

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Insert Table 1 about here

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behaviors assessed (vocalizing, looking at the door, smiling, following, playing, exploring, neutral behaviors, crying and fussing), only three of 36 possible correlations are significant. Looking at the door correlates positively with following and negatively with playing; playing also correlates negatively with exploring. Of the correlations which are significant, the inter-relationships of these behaviors are as would be predicted. However, it is striking how many relationships that also would be predicted are not, in fact, significant. It is also noteworthy that nine of the 36 correlations are not reported because the number of occurrences upon which they would be based is less than 10. The consistent finding of so few occurrences across both separation and reunion episodes at seven months seems particularly noteworthy in light of the large sample size upon which this portion of the study is based. Behaviors which should be indicative of attachment in situations thought to elicit attachment are sometimes quite few in number.

Inter-Correlations of Reunion Behaviors at Seven Months

These correlations presented in Table 2 are based on the three-minute reunion episode each infant experienced at seven months. The

Insert Table 2 about here

behaviors reported included vocalizing, looking, smiling, proximity seeking, touching mother, playing with mother, playing alone, exploring, neutral behaviors, crying and fussing. There are 55 possible correlations of these reunion behaviors, seven reach a standard level of significance. Looking at mother correlates with smiling, playing alone, exploring and neutral behaviors. Smiling also correlates with vocalizing, playing with and touching mother. In this matrix, nine correlations are excluded because the occurrences of these behaviors were less than 10.

Intra-Correlations at Seven Months of Separation and Reunion Behaviors

These correlations, designed to assess the relationship of similar attachment behaviors, for example, vocalizing, smiling, in separation and reunion situations, are presented in Table 3. The separation and reunion behaviors reported above were correlated with each other. Of the 99

Insert Table 3 about here

possible correlations in this matrix, nine are significant. Although no clear pattern emerges, playing during separation correlates negatively

with reunion touching and positively with reunion playing; exploring during separation correlates negatively with reunion playing and positively with reunion crying, neutral separation behaviors correlate positively with reunion vocalizing and crying at separation correlates positively with reunion touch. Only two correlations indicate intra-behavioral consistencies over the two situations; separation crying is correlated with reunion crying and vocalizing at separation is correlated with reunion vocalizing. Twenty-two correlations are not reported because of too few behavioral occurrences.

Attachment Behaviors at 13 Months

The attachment behaviors assessed at 13 months are based on the Ainsworth Strange Situation. This situation is somewhat different from that experienced by the infants at seven months. Rather than one separation and reunion episode each, the infants experienced a series of separations and reunions involving both the mother and a stranger. Episodes 4, 5, 6, and 7 were chosen as most appropriate for comparison with the seven month situation since these represent both reunion and separation experiences (Episode 8 was not available). Although a large number of behaviors are assessed in the Strange Situation, exploring, looking at mother or stranger, real crying, vocalizing, smiling and neutral behaviors were chosen for comparison purposes since they best approximate the behaviors assessed at seven months. Intra-behavioral correlations for the interactive behaviors assessed in the Ainsworth Situation are also pre-

sented. However, inter-correlations with seven month behaviors were not calculated since comparable behaviors were not available for the infants at seven months.

Inter-Correlations within Episodes of Attachment Behaviors at 13 Months

The inter-correlations of exploring, looking, crying, vocalizing, smiling and neutral behaviors are presented by episode in Table 4.

Insert Table 4 about here

Fifteen correlations are possible within each episode. In Episode 4, only one correlation (crying correlates negatively with exploring) reaches a standard level of significance; eight are eliminated as a result of too few behavioral occurrences. In Episode 5, the same correlation, crying and exploring, is also the only significant relationship. Only five correlations are eliminated because of too few occurrences. There are no significant correlations in Episode 6, and only two correlations were based on more than 10 behavioral occurrences. In Episode 7, two correlations are significant. Exploring again correlates negatively with crying. Exploring also correlates positively with looking at stranger. Ten correlations could not be calculated because of too few occurrences.

Intra-Correlations across Episodes of Attachment Behaviors at 13 Months

Table 5 presents the intra-correlations of the same six attachment behaviors reported above. Three correlations are significant. Exploring

in Episode 4 correlates with exploring in Episodes 5 and 7. Crying

Insert Table 5 about here

in Episode 4 correlates with crying in Episode 7. Six of the possible 18 correlations could not be calculated.

Intra-Correlations of Interaction Behaviors across Episodes at 13 Months

Proximity and contact seeking, contact maintaining, contact and interaction resisting, proximity and interaction avoiding, search during separation and distance interaction are also assessed in the Ainsworth Strange Situation. The intra-correlations of these behaviors are presented in Table 6. Correlations between Episode 4 and Episode 6 could only be calculated for search behavior since the infant is alone in

Insert Table 6 about here

Episode 6; likewise only correlations between Episode 4 and 6, and 4 and 7 are presented for search behavior since the mother is with the baby in Episode 5. All infants receive a score from one to seven (see Ainsworth and Wittig, 1969 for details) on each of the appropriate interactive behaviors, thus no correlations are eliminated as a result of too few behavioral occurrences. As Table 6 indicates, distance interaction in Episode 4 is significantly related to distance interaction in Episode

5 and all intra-correlations of interactive behaviors between Episode 4 and 7 are significant. This finding suggests that interactive behaviors, at least with a stranger, are remarkably stable across the two episodes.

Intra-Correlations of Similar Attachment Behaviors at Seven and 13 Months

In an attempt to compare attachment behaviors at the two different time periods, several separation and reunion behaviors at seven months were correlated with approximately similar behaviors at 13 months. Vocalizing, smiling, playing alone and playing with mother, exploring, crying and neutral behaviors of seven months were correlated with these same behaviors in Episodes 4, 5, 6 and 7 at 13 months. Since the Ainsworth Situation does not code playing behavior separately, exploring at 13 months was correlated both with exploring and playing at seven months under the assumption that playing behavior might be coded as exploratory behavior. As Table 7 indicates, only 25 of the possible 48 correlations

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Insert Table 7 about here

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could be calculated (correlations of looking at mother during reunion are inappropriate with Episodes 4 and 7) and of these, none are significant.

Commonalities in Behavioral Responses at Seven Months

In an attempt to move away from the analysis of discrete attachment behaviors and toward the analysis of commonalities in behavioral responses, two principal factor analyses were performed on the original sample of

147 infants.[1] The first factor analysis included all the separation behaviors: vocalizing, looking at the door, smiling, following, playing, exploring, neutral, crying and fussing. The second factor analysis included all the reunion behaviors: vocalizing, looking at mother, smiling at mother, proximity seeking, touching, playing with mother, playing alone, exploring, neutral, crying and fussing.

The analysis of separation behaviors yields three factors. The factor structures and loadings are presented in Table 8. The first factor accounts

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Insert Table 8 about here

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for 58 percent of the variance. Variables loading positively on this factor included exploring, following, looking, fussing and crying. Playing loads highly and negatively. This factor seems to reflect separation distress. Factors two and three of this analysis account for 23 and 19 percent of the variance. Vocalizing, smiling and exploring load positively on the second factor, while crying and fussing load negatively. Factor three yields positive loadings for looking, following and playing and a negative loading for neutral behaviors. These latter two factors appear to reflect activity in the absence of clear distress.

The factor analysis of reunion behaviors yields four factors. Factor one, explaining 44 percent of the variance, is predominantly accounted for by the variable touching which loads very highly and positively. Other

variables loading in a high positive direction on this factor are looking at mother, and playing with mother. Playing alone loads quite highly but negatively. Primarily, this factor seems to represent reunion touching behavior. Factor two, accounting for 27 percent of the variance, loads highly on smiling and looking at mother and moderately on vocalizing and playing with mother. The variable touching loads moderately and negatively on this factor. Factor two seems to reflect distal reunion behaviors. Factors three and four explain 16 percent and 11 percent of the remaining variance. The variable playing alone dominates factor three while factor four yields a moderate negative loading for fussing and a moderate positive loading for exploring. Both factors three and four seem to reflect non-attentive reunion behaviors. Examination of Table 9 indicates that overall touching seems to be the most significant of the reunion behaviors.

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Insert Table 9 about here

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In the 13 month sample, according to the Ainsworth criteria, there were 32 "B" or securely attached babies and 15 "A" unattached or avoidant babies. There were two "C" or insecurely attached babies in the sample. However, since they were so few in number, these were eliminated from all further analyses.[2]

Seven Month Behavior Patterns as Predictors of 13 Month Classifications

A multiple regression analysis was performed entering infant seven month factor scores for the three separation and four reunion factors as predictor variables and their attachment classification in the Ainsworth Strange Situation at 13 months as the criterion variable. The overall Multiple R ($R = .55$) is singificant, $F(7, 37) = 2.33$, $p < .05$. The overall $R^2 = .30$ (standard error = .0445), and the Adjusted $R^2 = .174$. Examination of Table 10 indicates that reunion factors one, three and four and separation factor three account for most of the variance in this analysis. Factor one, which is dominated by the variable reunion touching

Insert Table 10 about here

but also loads positively on the variables looking at and playing with mother, accounts for 11 percent of the variance and proves to be the most important predictor. Reunion factor three, dominated by the variable playing alone, accounts for almost nine percent of the variance with reunion factor four, which loads negatively on crying and positively on exploring, accounting for about three percent of the variance. Separation factor three loads positively on the variables looking, following and playing and loads negatively on neutral behaviors. This factor accounts for four percent of the variance. Separation factor one accounts for two percent of the variance and loads highly and negatively on playing alone. Each of the two remaining factors accounts for less than one percent of the variance. Thus, a somewhat simplified interpretation of these findings might be that infants who were to be classified at 13 months as Type "B" or securely attached, tended to look

at, play with, and especially touch their mothers during reunion at seven months more than babies who were later to be classified as Type "A" unattached or avoidant.

The data presented in both Tables 6 and 9 suggest that interaction is an important aspect of the predictability of attachment. In support of this conclusion, a variable simply called "Interaction" assessed every 10 seconds as present or absent in the seven month reunion episode is significantly correlated ($r = .326$, $p < .05$) with attachment classification at 13 months.

## Discussion

This study compared the correlational method of assessing and predicting attachment behaviors with a behavioral commonalities approach similar to that suggested by Masters and Wellman (1974). The findings reported above indicate that behavioral commonalities in specific situations permit a reasonable organization of inter-relationships among attachment behaviors and allow an accurate prediction of attachment from one period to another.

The intra- and inter-behavioral correlations among discrete attachment behaviors are consistently low both in the number which achieved statistical significance and the magnitude of the significant correlations. Although the somewhat conservative procedure of eliminating nonoccurrences from the calculations of the correlations was employed, the correlational results are especially surprising in light of the relatively large size of the seven month sample. If the second commonalities procedure had not been

employed, one might be tempted to fault the limited time period sampled. Only two minutes of separation and three minutes of reunion behaviors were observed at seven months and although the 13 month observations were 20 minutes in total, each episode was only three minutes. However, the ability of the regression analysis based on the factor scores of these same separation and reunion behaviors to predict 13 month attachment classification precludes this point.

The results of this study have methodological as well as substantive implications for infant attachment research. Methodologically, the present study adds support to Masters and Wellman's (1974) notion of behavioral commonalities. Waters (Note 1 and Note 2) has also reported the advantage of considering behavioral commonalities in situational events over the analysis of discrete attachment behaviors. Waters' data were based on observations of infants at 12 and then 18 months. The results reported above extend the general technique by indicating its appropriateness with seven and 13 month olds. The present study also indicates that even if the sample size is enlarged to well above the norm for infant studies, the analysis of discrete attachment behaviors will not yield an adequate assessment of infant attachment. However, the procedures for analyzing behavioral commonalities employed in the present study, factor analyses and multiple regression, do require somewhat larger samples than often employed in infant studies. The successful prediction of infant classification in the Ainsworth Strange Situation at 13 months based on five minutes of behaviors at seven months suggests that the effort required to increase the

sample size is justifiable if one's goal is to assess the global construct of attachment and attempt to predict from one point in time to another. Similarly, other methods of assessing behavioral commonalities which have not yet been explored may be available that do not require the same restrictions. Indeed, although the discrete attachment behaviors assessed in the Strange Situation were not highly correlated with each other or with seven month behaviors, it seems clear that the Ainsworth classification of attachment type incorporates commonalities in episode responses for the classification of an infant as "A," "B" or "C." This method of classification is basically qualitative and thus requires no restriction of sample size. In terms of methodological implications, the results of the present study suggest that attachment measures, both qualitative and quantitative, should be explored which empahsize attachment patterns as evidenced in particular situations, especially reunion.

Substantively, these findings suggest that the qualitative individual difference patterns that Ainsworth (e.g., Ainsworth, Bell and Stayton, 1972) has documented with 12 month old infants can be established as early as seven months. With the use of behavioral commonalities, it is possible to distinguish the qualitative differences reflected in "A," "B," and "C" types of attachment at a much earlier age.

Tracy, Lamb and Ainsworth (1976) and Lamb (1977) have discussed a distinction between an affiliative system and an attachment system. The present results also lend indirect support to this notion. Although

both systems may be represented by the same behaviors, they are activated by different situations. Extrapolating from our data and others', it seems likely that separation and especially reunion situations are the best situational activators of the attachment system toward mother whereas free play situations, especially in the presence of the mother, are more likely to activate an affiliative system towards others. (Analysis of our preseparation data at seven months showed no relation to 13 month attachment classification.) Thus, it seems necessary that measures and definitions of attachment be careful to exclude situations that are more likely to activate an affiliative rather than an attachment system.

An equally interesting aspect of the present findings is the particular patterns of behavior that seem to be important. Similar to those of Water (Note 1) and Ainsworth, et al. (1971), these data suggest that reunion behaviors, especially reunion touching, are critical to the discrimination of what Ainsworth (1972) has termed quality of attachment. Although touch per se has not been particularly more reliable in previous studies of the inter- and intra-correlations of attachment behaviors, touching during a reunion episode seems to be particularly important as a predictor for later attachment classifications. This finding reaffirms that attachment is most clearly evidenced by contact or proximity seeking in times of stress, most commonly reunion after a stressful separation. Considering the limited data available at this point, it is impossible to determine if reunion touching patterns of behavior can be considered a primary dis-

criminant of attachment quality or if--to make matters even more complicated--it is necessary to determine the probable intricate antecedent set of behaviors to which a reunion touching pattern is consequent. Future studies might examine the dyadic sequencing of events. This may also be helpful to the understanding of the development of an attachment system; for example, "B" mothers may generally pick up their infants at reunion throughout the first year of life whereas "A" mothers may not. Ainsworth (1974), among others, has frequently emphasized the importance of reciprocal responsiveness in the development of infant's mother attachment.

In conclusion, the present results support Masters and Wellman's (1974) suggestions concerning appropriate measurement techniques of attachment in infants. Although the limitations of size and population in the present study suggest caution with regard to the generalizability of these findings, the authors do feel that the focus on commonalities and/or behavior patterns is a fruitful one. Replication and extension of studies of this type may improve the reliability and validity of the attachment construct while at the same time offering some important additions to our knowledge of the construct. Decreased emphasis on discrete attachment behaviors and increased emphasis on commonalities of responses within a situational contexts may provide new information about the psychosocial development of the infant.

## Footnotes

[1]It should be noted that factor analysis for reunion and separation behaviors were also performed separately for boys and girls. These analyses, although not entirely appropriate because of the consequent decrease in sample size, did suggest that the factor structures were similar, thus increasing our confidence in pooling the sexes in further analyses.

[2]A chi square analysis of Attachment Type x Sex was not significant.

## Reference Notes

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Table 1

Inter-Correlations of Separation Behaviors at Seven Months

| | S Voc | S Lk Dr | S Smile | S Follow | S Play | S Expl | S Neut | S Cry |
|---|---|---|---|---|---|---|---|---|
| S Vocalize | | | | | | | | |
| S Look Door | -.168 (72) | | | | | | | |
| S Smile | -- (9) | -.085 (12) | | | | | | |
| S Follow | -.164 (16) | .592** (20) | -- (3) | | | | | |
| S Play | -.054 (84) | -.356** (74) | .085 (11) | -.330 (17) | | | | |
| S Explore | -.119 (73) | .175* (73) | -.278 (12) | -.184 (24) | -.530** (75) | | | |
| S Neutral | .150 (16) | -.075 (16) | -- (2) | -- (2) | -.502 (11) | .134 (16) | | |
| S Cry | -.388 (17) | -.078 (21) | -- (2) | -- (9) | -.315 (19) | .131 (22) | -- (8) | |
| S Fuss | -.231 (18) | -.0 (38) | -- (1) | -.139 (16) | -.140 (36) | .177 (42) | -- (0) | -.310 (23) |

*p < .05
**p < .01

Table 2

Inter-Correlations of Reunion Behaviors at Seven Months

| | R Voc | R Look | R Smile | R Proximity | R Touch | R Play M | R Play Alone | R Explore | R Neut | R Cry |
|---|---|---|---|---|---|---|---|---|---|---|
| R Voc | | | | | | | | | | |
| R Look | .005 (123) | | | | | | | | | |
| R Smile | .392 (65) | .470** (70) | | | | | | | | |
| R Proximity | .250 (28) | .007 (32) | .261 (17) | | | | | | | |
| R Touch | -.149 (68) | .184 (78) | .010 (39) | -.153 (27) | | | | | | |
| R Play M | .047 (32) | .310 (36) | -.467 (25) | -.141 (12) | .495** (27) | | | | | |
| R Play Alone | -.037 (108) | -.323 (122) | -.226 (62) | -.141 (27) | -.127 (63) | -.110 (31) | | | | |
| R Explore | -.024 (52) | -.366** (66) | -.297 (34) | .207 (22) | .167 (44) | -.139 (20) | -.044 (54) | | | |
| R Neutral | -.016 (15) | -.531* (13) | -- (7) | -- (6) | .053 (11) | -- (4) | .055 (15) | (10) | | |
| R Cry | -.221 (15) | -.002 (19) | -- (6) | -- (5) | .486 (15) | -- (5) | -.418 (14) | (9) | -- (1) | |
| R Fuss | -.125 (45) | -.008 (52) | -.250 (21) | -.270 (12) | -.215 (39) | -.281 (17) | .084 (41) | -.082 (27) | -- (4) | -.188 (17) |

*p < .05
**p < .01

Table 3

Inter-Correlations at Seven Months of Separation and Reunion Behaviors

| | S Voc | S Lk Dr | S Smile | S Follow | S Play | S Expl | S Neut | S Cry | S Fuss |
|---|---|---|---|---|---|---|---|---|---|
| R Voc | .436** (94) | .043 (81) | -- (9) | .153 (24) | .088 (94) | -.197 (87) | .520 (20) | -.067 (26) | -.199 (46) |
| R Look | -.135 (103) | .056 (96) | -.231 (12) | .007 (27) | -.177 (111) | .183 (101) | .195 (23) | -.182 (33) | .089 (52) |
| R Smile | .075 (54) | -.259 (48) | -- (6) | -.119 (13) | .088 (59) | .009 (53) | -- (8) | -.211 (14) | -.207 (22) |
| R Prox | .335 (23) | -.153 (26) | -- (5) | .187 (15) | -.104 (26) | -.341 (28) | -- (4) | -- (6) | -- (10) |
| R Touch | -.071 (58) | .102 (61) | -- (7) | .132 (24) | -.127 (57) | .009 (61) | .387 (12) | .514** (25) | .291 (38) |
| R Play M | -.017 (25) | .206 (32) | -- (4) | .179 (11) | -.271 (29) | .070 (30) | -- (5) | -.121 (13) | .065 (21) |
| R Play | -.129 (90) | -.118 (81) | -- (9) | -.328 (23) | .448** (98) | -.271* (83) | -.300 (19) | -.114 (25) | .171 (41) |
| R Expl | -.042 (45) | .185 (47) | -- (7) | .361 (17) | -.038 (51) | -.017 (51) | -- (6) | -.309 (14) | .162 (26) |
| R Neut | .091 (14) | -.171 (14) | -- (3) | -- (3) | .009 (13) | -.106 (14) | -- (5) | -- (1) | -- (6) |
| R Cry | -- (10) | -.157 (12) | -- (1) | -- (5) | -.220 (12) | .576* (15) | -- (3) | .660** (16) | -.123 (13) |
| R Fuss | -.289 (31) | .041 (37) | -- (4) | .309 (14) | -.307 (34) | -.198 (36) | -.276 (11) | .099 (26) | .148 (35) |

*p < .05
**p < .01

Table 4

Inter-Correlations at 13 Months Across Behaviors within Episodes 4-7

| | Expl 4 | Lk S 4 | R Cry 4 | Voc 4 | Smile 4 | Neut 4 |
|---|---|---|---|---|---|---|
| Explore 4 | | | | | | |
| Look S 4 | .150 (41) | | | | | |
| Real Cry 4 | -.535* (16) | -.440 (16) | | | | |
| Vocalize 4 | .340 (22) | .282 (22) | -- (4) | | | |
| Smile 4 | .335 (11) | .322 (11) | -- (0) | -- (10) | | |
| Neutral 4 | -- (2) | -- (3) | -- (0) | -- (1) | -- (1) | |

| | Expl 4 | Lk M 5 | R Cry 5 | Voc 5 | Smile 5 | Neut 5 |
|---|---|---|---|---|---|---|
| Explore 5 | | | | | | |
| Look M 5 | .289 (44) | | | | | |
| Real Cry 5 | -.581* (17) | -.103 (16) | | | | |
| Vocalize 5 | .219 (33) | .062 (32) | -.211 (14) | | | |
| Smile 5 | .452 (15) | .273 (15) | -- (7) | .201 (14) | | |
| Neutral 5 | -- (5) | -- (5) | -- (3) | -- (3) | -- (2) | |

*p < .05
**p < .01

Table 4 (continued)

| | Expl 6 | | R Cry 6 | Voc 6 | Smile 6 | Neut 6 |
|---|---|---|---|---|---|---|
| Explore 6 | | | | | | |
| Real Cry 6 | -.880<br>(14) | | | | | |
| Vocalize 6 | .251<br>(16) | | --<br>(6) | | | |
| Smile 6 | --<br>(1) | | --<br>(1) | --<br>(1) | | |
| Neutral 6 | --<br>(4) | | --<br>(1) | --<br>(1) | --<br>(0) | |

| | Expl 7 | Lk S 7 | R Cry 7 | Voc 7 | Smile 7 | Neut 7 |
|---|---|---|---|---|---|---|
| Explore 7 | | | | | | |
| Look S 7 | .415*<br>(32) | | | | | |
| Real Cry 7 | -.471*<br>(18) | -.089<br>(24) | | | | |
| Vocalize 7 | .493<br>(15) | -.358<br>(15) | --<br>(5) | | | |
| Smile 7 | --<br>(9) | --<br>(9) | --<br>(0) | --<br>(8) | | |
| Neutral 7 | --<br>(3) | --<br>(3) | --<br>(2) | --<br>(1) | --<br>(0) | |

*p < .05
**p < .01

Table 5

Intra-Correlations within Behaviors Across Episodes 4-7

| | 5 | 6 | 7 |
|---|---|---|---|
| Explore 4 | .505** (42) | .352 (27) | .566** (33) |
| Look S 4 | -- (0) | -- (0) | .157 (38) |
| R Cry 4 | -.176 (17) | -.269 (18) | .581** (18) |
| Vocalize 4 | .458 (18) | .435 (11) | .785** (12) |
| Smile 4 | -- (6) | -- (0) | -- (5) |
| Neutral 4 | -- (0) | -- (0) | -- (0) |

**$p < .01$

Table 6

Intra-Correlations of Interactive Behaviors

with Variables across Episodes 5-7

| | 5 | 6 | 7 |
|---|---|---|---|
| Proximity and Contact Seeking 4 | -.093 (47) | | .348* (46) |
| Contact Maintaining 4 | .176 (47) | | .574** (46) |
| Contact and Interaction Resisting 4 | .277 (47) | | .488** (46) |
| Proximity and Interaction Avoiding 4 | -.053 (47) | | .387** (46) |
| Search During Separation 4 | | .185 (47) | .494** (46) |
| Distance Interaction 4 | .295* (47) | | .732** (46) |

*p < .05
**p < .01

Table 7

Intra-Correlations of Similar Behaviors at 7 and 13 Months

| | Episode 4 | Episode 5 | Episode 6 | Episode 7 |
|---|---|---|---|---|
| S Vocalize | -.361 (29) | .023 (26) | .082 (14) | .358 (1) |
| S Smile | -- (1) | -- (4) | -- (0) | -- (1) |
| S Play | -.036 (35) | -.014 (36) | .231 (21) | .028 (27) |
| S Explore | .174 (33) | .316 (36) | -.324 (23) | .028 (27) |
| S Neutral | -- (1) | -- (0) | -- (1) | -- (1) |
| S Cry | -- (4) | -- (5) | -.0 (11) | -- (10) |
| R Vocalize | -.005 (36) | -.301 (29) | -.056 (13) | -- (2) |
| R Smile | -- (6) | -- (8) | -- (0) | -- (2) |
| R Play | .054 (37) | .052 (40) | -.196 (22) | .369 (16) |
| R Explore | .124 (20) | -.269 (22) | .461 (12) | .369 (16) |
| R Neutral | -- (1) | -- (1) | -- (0) | -- (1) |
| R Cry | -- (3) | -- (3) | -- (6) | -- (6) |
| R Look at Mother | | -.156 (44) | -.050 (16) | |

Table 8

Factor Analysis of Separation Behaviors in Infants at Seven Months

| | Factor 1 | Factor 2 | Factor 3 |
|---|---|---|---|
| Vocalizing | -.314 | .425 | -.198 |
| Looking for Mother | .337 | .183 | .338 |
| Smiling | -.005 | .339 | -.050 |
| Following | .389 | .060 | .405 |
| Playing | -.935 | -.113 | .322 |
| Exploring | .462 | .314 | .063 |
| Neutral | .202 | -.006 | -.318 |
| Crying | .319 | -.424 | -.129 |
| Fussing | .330 | -.194 | .133 |

Table 9

Factor Analysis of Reunion Behaviors in Infants at Seven Months

| | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|---|---|---|---|---|
| Vocalizing | -.010 | .319 | -.080 | .019 |
| Looking at Mother | .564 | .449 | .058 | -.147 |
| Smiling | .276 | .576 | -.029 | .029 |
| Proximity Seeking | .109 | .050 | -.133 | .224 |
| Touching | .807 | -.361 | .321 | .241 |
| Playing with Mother | .470 | .314 | .039 | .219 |
| Playing Alone | -.656 | .223 | .606 | .149 |
| Exploring | -.013 | -.208 | -.089 | .301 |
| Neutral | -.123 | -.130 | -.384 | .194 |
| Crying | .285 | -.380 | .191 | -.124 |
| Fussing | .230 | -.151 | .027 | -.378 |

Table 10

Summary Table of Multiple Regression Analysis

| | Zero Order Correlation | Beta | Variance Explained |
|---|---|---|---|
| Reunion Factor 1 | .336 | .519 | .113 |
| Reunion Factor 3 | .258 | .378 | .087 |
| Reunion Factor 4 | -.063 | -.202 | .034 |
| Separation Factor 1 | -.046 | -.282 | .024 |
| Separation Factor 3 | -.023 | -.199 | .042 |
| Separation Factor 2 | .071 | .098 | .006 |
| Reunion Factor 2 | .091 | -.036 | .001 |